

REMARKS

The specification has been amended to correct typographical errors only and, consequently, no new subject matter has been added to the specification. Claims 1 and 13 have been amended, claims 5-7 and 11 have been canceled, and claims 25-32 have been added. As such, claims 1-4, 8-10, 12-20, and 25-32 are currently pending in the case. Further examination and reconsideration of the presently claimed application are respectfully requested.

Section 102 Rejection

Claims 1-11, 13-17, and 19 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent Application No. 2003/0235983 to Li et al. (hereinafter referred to as “Li”). Claims 5-7 and 11 have been canceled rendering rejection thereto moot. A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. Of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987), MPEP 2131. Li does not teach or suggest all limitations of the currently pending claims, some distinctive limitations of which are set forth in more detail below.

Li does not teach or suggest a system with a plurality of reservoirs serially coupled to a chamber and devices adapted to maintain a process fluid within the chamber and different sets of the reservoirs within ascending temperature ranges, wherein the process fluid in the chamber comprises the highest temperature range, and wherein a minimum temperature of the lowest of the temperature ranges is greater than an ambient temperature of an environment surrounding the reservoirs corresponding to such a temperature range.

Amended independent claim 1 recites in part:

A system, comprising: a chamber configured to process one or more wafers for the fabrication of microelectronic devices; a plurality of reservoirs serially coupled to the chamber via a plurality of intervening pipes ... a first set of one or more devices adapted to maintain the process fluid supplied to the chamber within a first temperature range; a second set of one or more devices adapted to maintain the process fluid residing in a first set of the plurality of reservoirs within a

second temperature range lower than the first temperature range; and a third set of one or more devices adapted to maintain the process fluid residing in a second set of the plurality of reservoirs within a third temperature range lower than the first and second temperature ranges, wherein the minimum temperature of the third temperature range is higher than an ambient temperature of an environment surrounding the second set of the plurality of reservoirs.

Support for the amendments to claim 1 may be found, for example, on page 5, line 5-6 and page 24, lines 14-16 of the specification.

Li teaches systems that are configured to heat a process fluid prior to being introduced into a plating chamber at a temperature lower than subsequently used in the plating chamber. Li, however, fails to teach or suggest that any of such systems are configured to heat a process fluid within two distinct temperature ranges with respect to an ambient temperature of an environment in which at least one of the reservoirs is arranged prior to introducing the fluid into the plating chamber and, as such, fails to anticipate the limitations of claim 1. Rather, Li specifically teaches systems which are only configured to heat a process fluid via one of pre-heat tank 110, heated line 107, and holding tank 100. There is no teaching or suggestion within Li of modifying the system embodiments to perform the pre-heat process within a multiple of such components.

In particular, Li teaches in reference to Figs. 1 and 3, systems that are configured to preheat a bath solution in either pre-heat tank 110 or heated line 107. “In one embodiment, as illustrated in Fig. 1, a portion of the bath solution can be removed from tank 100 via line 105 to a smaller pre-heat tank 110 ... The bath solution can be pre-heated in pre-heat tank 110...” (Li -- ¶ 0042). “In an alternative embodiment of the present invention, such as that illustrated in Fig. 3, rather than pre-heating the bath solution in pre-heating tank 110, the bath solution can be pre-heated in a heated line 107.” (Li -- ¶ 0043). In reference to such systems, Li specifically states “... the bath solution in the holding tank 100 can generally be at ambient temperature or can even be cooled somewhat so as to prolong the life of the bath solution.” (Li -- ¶ 0039). As such, there is no teaching or suggestion within such embodiments of heating a process fluid within holding tank 100 to a temperature higher than an ambient temperature of an environment

surrounding the holding tank. Consequently, such embodiments do not anticipate the limitations of claim 1.

Li further teaches “[i]n yet another alternative embodiment of the present invention, the bath solution can be charged to the plating chamber with no intermediate preheating of the solution at all, such as when it is shown to be more cost effect to heat the bath solution to the deposition temperature in only one step in the plating chamber rather than in two separate heating steps.” (Li -- ¶ 0045). Since such a system negates the idea of heating a process fluid within three temperature ranges, such a system does not anticipate the limitations of claim 1. Furthermore, there is no motivation within Li to modify the systems described therein to meet the limitations of claim 1. Consequently, claim 1 is asserted to be patentably distinct from Li.

Li does not teach or suggest a system with a plurality of volume sensors positioned such that a chamber and a plurality of tanks within the system are characterized into at least three different zones based upon adaptations of the volume sensors to maintain different volumes of a process fluid in the respective zones. Amended independent claim 13 recites in part:

A system, comprising: a chamber configured to process one or more wafers for the fabrication of microelectronic devices; a plurality of tanks serially coupled to the chamber and adapted to store a process fluid used to treat the wafers ... and a plurality of volume sensors positioned within the plurality of tanks such that the chamber and the plurality of tanks are further characterized into the at least three different zones based upon adaptations of the volume sensors to maintain different volumes of the process fluid in the respective zones.

Support for the amendments to claim 13 may be found, for example, on page 22, lines 7-25 of the specification.

Li fails to teach or suggest the inclusion of volume sensors within holding tank 100 or pre-heat tank 110, much less configuring volume sensors within the systems described therein to characterize plating chamber 120 and the tanks into at least three different zones based upon adaptations of the volume sensors to maintain different volumes of the process fluid in the respective zones. As such, Li fails to anticipate the limitations of claim 13. Furthermore, there

is no motivation within Li to modify the systems to include such volume sensors since Li specifically discusses having pre-heat tank 110 having the same volume of process fluid as used in plating chamber 120. “In general, plating chamber 120 can be about the same size as pre-heating tank 110.” (Li -- ¶ 0046). Further emphasis for having pre-heat tank 110 and chamber 120 the same size is illustrated in Fig. 1. Since there is no teaching, suggestion, or motivation within Li to teach the limitations of claim 13, it is asserted that claim 13 is patentably distinct over claim 13.

For at least the reasons cited above, claims 1 and 13 are patentably distinct over Li. In addition, dependent claims 2-4, 8-10, 14-17, and 19 are believed patentably distinct over Li for at least the same reasons as their respective base claims 1 and 13. As noted above, claims 5-7 and 11 have been canceled rendering rejection thereto moot. Accordingly, removal of the § 102(e) rejections of claims 1-11, 13-17, and 19 is respectfully requested.

Section 103 Rejections

Claims 12, 18, and 20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Li. As noted above, independent claims 1 and 13 are patentably distinct over Li. In addition, dependent claims 12, 18, and 20 are believed patentably distinct over Li for at least the same reasons as their respective base claims 1 and 13. Accordingly, removal of the § 103(a) rejection of claims 12, 18, and 20 is respectfully requested.

Patentability of Added Claims

The present amendment adds claims 25-32. As noted above, independent claim 13 is patentably distinct over Li. Moreover, dependent claims 25 and 26 are believed allowable over Li for at least the same reasons as base claim 13. Support for the limitations of claims 25 and 26 may be found, for example, on page 11, lines 15-23 and page 12, lines 1-12 of the specification.

As set forth in more detail below, claims 27-32 are patentably distinct over the cited art. Support for the limitations of added claims 27-32 may be found, for example, in Figs. 1a-1c and corresponding text of the specification.

None of the cited art teaches or suggests a system having an intermediate tank interposed between a chamber and a storage tank and further having a set of pipes configured to transport process fluid from the chamber directly to the intermediate tank. Added claim 27 recites in part: “A system, comprising: a chamber configured to process one or more wafers for the fabrication of microelectronic devices ... a storage tank configured to hold the process fluid; an intermediate tank interposed between the chamber and the storage tank ... and a third set of pipes configured to transport the process fluid from the chamber directly to the intermediate tank.” Support for the limitations of added claim 27 may be found, for example, on page 23, lines 19-29 of the specification.

Although Li teaches the systems described therein including line 115 for routing bath solution from plating chamber 120 to holding tank 100, there is no teaching or suggestion within Li of incorporating lines for routing bath solution from plating chamber 120 to an intermediate tank interposed between plating chamber 120 and holding tank 100, such as pre-heat tank 110. As such, Li fails to anticipate the limitations of claim 27. Furthermore, there is no motivation within Li to modify the systems described therein to include a line routing bath solution from plating chamber 120 to an intermediate tank, such as pre-heat tank 110. In particular, Li specifically teaches that routing the bath solution back to holding tank 100 may advantageously lower the temperature of the solution so that high temperature decomposition of the solution can be avoided and water replenishment to the bath solution can be decreased. (*See* Li -- ¶ 0061). Such benefits may not be realized if the solution is simply returned to pre-heat tank 110 since Li specifically teaches maintaining the solution in pre-heat tank 110 at a temperature very close to the minimum deposition temperature of the solution.

For at least the reasons noted above, added independent claim 27 is patentably distinct over Li. Furthermore, added dependent claims 28-32 are believed patentably distinct over Li for at least the same reasons as base claim 27. As noted above, claims 25 and 26 are allowable over

Li for at least the same reasons as claim 13. Accordingly, approval of added claims 25-32 is respectfully requested.

CONCLUSION

This response constitutes a complete response to all of the issues raised in the Office Action dated May 4, 2006. In view of the remarks traversing herein, Applicants assert that pending claims 1-4, 8-10, 12-20, and 25-32 are in condition for allowance. If the Examiner has any questions, comments, or suggestions, the undersigned earnestly requests a telephone conference.

No fees are required for filing this amendment; however, the Commissioner is authorized to charge any additional fees, which may be required, or credit any overpayment, to Daffer McDaniel LLP Deposit Account No. 50-3268/5866-00400.

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